FIELD MUSEUM STORIES

Alaskan Forests

FIELD MUSEUM of NATURAL HISTORY
FOUNDED BY MARSHALL FIELD 1893
CHICAGO

Series XXXVIII, No. 1
March 7, 1942

Looseleaf No. 55

ALASKAN FORESTS

A coastal forest

Alaska's forests are one of its valuable assets. Forty per cent of the land is covered with trees and two very different types of forest are found there. Salmon, copper, tin, gold, and skins are sent elsewhere but lumber is used at home and little of it leaves Alaska. Indians in the coastal region have long used the wood for carving their dugout canoes, chests, and food containers, and during recent times it has been used for the construction of their famed totem poles. Their clothing, mats, fish-lines, and fish-nets are made from the shredded bark of the Alaska spruce trees.

The best timber grows along the southern coast from British Columbia up to the Aleutian Islands. This timber belt is a continuation of the coniferous forests that grow so luxuriantly in our northwestern Pacific states, although, unlike the United States forests, it contains no Douglas fir, Ponderosa pine, or redwoods. The trees of the northern coast of Alaska are almost pure stands of Sitka spruce, with a sprinkling of hemlock and Alaska cedar. Moss, which flourishes in damp climates, hangs in long strands from the trees. Huge boulders are covered with a matting of vegetation, and sphagnum fills the frequent small ponds. The Sitka, or tideland spruce, is the largest of all the spruce trees and sometimes grows as high as two hundred feet. It is the most valuable timber tree of Alaska and the lumber is sometimes shipped to the United States.

The development of the immense trees is aided by a mild climate and abundant rainfall. Winds containing an excessive amount of moisture blow in from the Pacific Ocean and cross the warm Japanese current which flows along the western coast of North America. Reaching the cooler land, the moisture condenses to heavy fogs and frequent drizzles. A sunshiny day is an event in the continuous mist and rain. The temperature ranges from 0° to 90° F. and therefore is not as severe as that of Chicago.

In spite of the rarity of sunshine, visitors to southern Alaska say the forested coast is one of the most beautiful regions in the world. Sheer cliffs rise from the ocean and deep fjords indent the coastline. There are few beaches. A mantle of variegated green covers the steep slopes and numerous islands, and the pale green of cedars is broken by dark spots of hemlock and patches of bluish-green spruce. From a passing ship, it is difficult to realize the height or extent of these forests.

Alaskan interior forests are composed of white birch, white and black spruce, poplars, willows, and alder. They cover the lower slopes of the Sierras. Their height is only about twenty-five feet, but while they will never attract many visitors or lumbermen and probably never will be exported, these forests have contributed much to the growth of Alaska. Shanties of gold rush prospectors, cabins of pioneers, railroad ties, and wireless towers have been built from their timber. Their yield will never be large but it is adequate and most essential for local needs.

This section of Alaska has a short but intense growing season. Flowers of northern plants are often more brilliant than those of temperate regions and snow has scarcely disappeared in the spring before open glades and meadows are a blaze of color. Violets, bluebells, rhododendrons, ferns, and several varieties of orchids are found. The natives pick many kinds of edible berries, including elderberries, raspberries, cranberries, currants, and blueberries.

A low range of mountains separates the interior region from the Arctic Ocean. The interior is a network of rivers and lakes with many waterfalls. Navigable outlets to the coast are provided by the Yukon and Copper rivers.

In contrast to the coastline climate, that of the interior is bright and cold. Temperature ranges from –60° to 87° F. Days are clear and sunny. Rainfall is very light and in summer destructive fires are common.

MARIE B. PABST
Raymond Foundation

NOTE: Hall 26 contains examples of several Alaskan trees while in Hall 10 there are examples of Indian usage of these trees.

This page is for your own notes and illustrations

FIELD MUSEUM STORIES

Fishermen and Farmers of Hawaii

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March 14, 1942

Looseleaf No. 56

FISHERMEN AND FARMERS OF HAWAII

Hawaiian sailing-canoe

Out of the southwest Pacific long ago sailed great wooden canoes carrying explorers and their families who had left their island homeland and were looking for new islands where they could live. The men paddled the big boats and the wind filled out the matting sails shaped like lobsters' claws.

These explorers finally settled on a little group of islands which they named "Hawaii" after the land from which they had come. Their new home had high mountains with wooded slopes, and green valleys with clear streams. White-capped waves lapped on the beaches of sand and coral.

The men and boys spent much time fishing. They used round nets with little stone weights around the edges, or sometimes they stood on the rocks and speared fish, or sat and dangled a line with a gleaming shell hook on the end. The octopus could be caught by poking a stick into its cave under the water. It would wrap its arms around the stick and then could be easily pulled from its den. These seafoods and the pigs and chickens that the people raised provided plenty of meat.

The explorers had brought with them and planted seeds and roots of sweet potatoes, yams, taro, bananas, breadfruit, and coconuts. To make "poi," the main food of the Hawaiians, taro roots were steamed until they were soft and then were pounded into a mash. This was fermented, thinned out with water, and served in a polished wooden bowl. The people dipped their fingers into the sticky "poi" and then neatly licked them clean. Breadfruit, roasted and peeled, tasted like fresh bread. The milk of coconuts made a refreshing drink, and the grated meat mixed with water was strained to make a creamy sauce for fish.

The men cooked the food in big ovens dug in the ground. The meat or vegetables, wrapped in large green leaves, were put in the hole, covered with hot coals and earth, and left until they were well baked. The meal was served in wooden platters and bowls, or in dishes made of coconut shells or gourds. The people ate in the front yard, sitting on woven mats in front of a table of green leaves spread on the ground.

The climate was so warm and sunny that they wore very few clothes, just loincloths or short skirts made of leaves or of tapa cloth. They made tapa from the inner bark of young paper mulberry trees, soaked until it was soft. With sticks they beat the bark into sheets and then painted designs on them. The chiefs and noble people wore wonderful mantles made of hundreds of yellow and red feathers. On the beaches were shells which could be strung into necklaces. Bright feathers or sweet-smelling flowers were made into bracelets and necklaces, called "leis."

The people were out of doors most of the day and the square one-room house was usually used just for a place to sleep. The walls and roof were covered with grass. There were no windows at all and the doorway was so small that grown people had to bend over to go through it. The one big room was quite bare except for a wooden platform on which woven mats were spread for beds. There was little light in the room, but often the people burned oily candle-nuts threaded on a string or a twig, or used stone lamps with candle-nut oil and tapa wicks.

Everyone knew how to swim and often there were swimming races and fancy diving. One of the favorite sports was surfboard riding. The riders pushed their long thin boards out through the breaking waves, then, standing on the board, rode in to shore on the crest of a great breaker. Sometimes whole teams of riders raced to shore in this manner, or they had races in wooden dugout canoes. The Hawaiians liked to bowl with round stones and sometimes they slid down the grassy hills on wooden sleds.

There were dances, called "hulas," where trained dancers acted out stories, singing as they danced. These were the stories of long ago, of the gods and heroes, and of the origin of the people. The older people sat on the sidelines playing wooden or gourd drums and singing the chorus of the songs.

But all this life has changed. Since 1778, when Captain Cook and his followers landed on the Hawaiian Islands, more and more people have gone there to live—Americans and English, Spanish and Portuguese, Chinese and Japanese. All have brought their customs and ways of living to the islands and the Hawaiian natives have adopted many of these ways and given up some of their old ones.

ELIZABETH McM. HAMBLETON
Raymond Foundation

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FIELD MUSEUM STORIES

Some Ways of Self-Preservation Among Animals

Series XXXVIII, No. 3
March 21, 1942

Looseleaf No. 57

SOME WAYS OF SELF-PRESERVATION AMONG ANIMALS

Canadian Porcupine

Small or large, feeble or strong, most animals that might be food for others, at one time or another are beset by their enemies and obliged to protect themselves. The ways in which they do so are many and varied—some animals try only to avoid or be avoided by an attacker, others rely on suits of armor, and still others put to good use whatever weapon they possess that will injure and drive the enemy away.

Some kinds of avoidance defenses may take their owners far out of reach of danger. Though rabbits have sharp teeth which they use when all else has failed, they usually depend for protection on the long hind legs that carry them as if by seven-league boots to the nearest hole or cover. Other animals can sometimes give themselves more time in which to escape by using devices that slow up the pursuer. Thus the squid, the underwater speedboat of the ocean, holds within its body a sac filled with black dye and when enemies are too close for an easy getaway, one squirt of inky fluid into the water makes a screen, behind the shadow of which the animal spurts away. Some of the long-tailed lizards that live in the southern part of the United States have an even more unusual way of baffling their enemies, for when one is pursued it can, with no harm to itself, leave behind the still wriggling hind end of its tail for the attacker to examine, and in the meanwhile dart off to safety.

Certain animals are so well outfitted that they neither run away nor fight, but still can remain fairly safe wherever they may happen to be. A long-legged spider crab that lives near the shores of the Florida coast, plucks bits of sponge or algae from the ocean floor and transplants them to the knobs and spines atop its back. Under the shelter of this flourishing garden it can go about quite secure on its own hunt for food. A few other animals need not try to disguise themselves; the snail, for one, slides back into the labyrinth of its shell or house whenever it is sufficiently threatened; the turtle jerks its head, tail, and legs into the space between the tough bony flooring and roof that case its body. The most efficient arrangement of any is that of the three-banded armadillo from Argentina and Brazil, for it is the only one of its family able to roll into a ball and so present to its enemies a hard slippery surface that few teeth can either grasp or dent.

Many animals, particularly those which the meat-eaters hunt out for food, defend themselves by painfully injuring their enemies. One of their weapons—feet—takes on an assortment of shapes in various animals, for the hard hoof of a horse or the two strong toes of the African ostrich can both give powerful kicks, and the stout nails of the anteater can as easily rip apart dogs as termite nests. Many of the animals with hooves also wear a set of headpieces and though these are sometimes nothing more than ornaments, many of them are well used against foes or rivals. Instead of such horns or antlers, the peccaries, South American relatives of the pigs, carry long side teeth as bayonets.

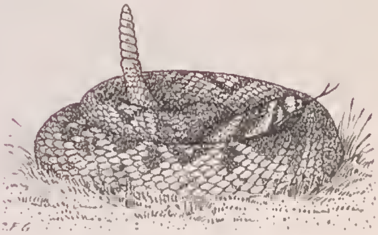
One animal, the porcupine, with very little effort can dole out quite as much misery and discomfort as all the teeth, feet, and horns of others together. Spread over the upper parts of its body is a long hair matting run through with quills, and each of these is roughened at its point with small barbs or hooklets. The nose or paw of an unwary dog has only to touch the bristly body to be pierced with stick-tight quills. Few animals, once having attacked and survived, will try a porcupine again.

ELIZABETH BEST
Raymond Foundation

NOTE: Most of the animals that were mentioned above can be found in Halls M, 15, and 18.

How does the rattlesnake keep from being stepped on?

(See Field Museum Story, Series XXXIII, No. 2, October 14, 1939.)



Coiled Rattlesnake

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FIELD MUSEUM STORIES

Maple Sugar

Series XXXVIII, No. 4
March 28, 1942

Looseleaf No. 58

MAPLE SUGAR

A sugar house in New England

In the early days of the United States a visitor to Thomas Jefferson's Virginia plantation, wrote home, "Mr. Jefferson uses no other sugar in his family than that which is obtained from the sugar maple tree. He has lately planted an orchard of maple trees on his farm in Virginia." The Indians were the first to use tree sap as a source of sugar and they sometimes tapped birch and butternut as well as maple trees. Learning from them, early settlers found an important article of food in maple sugar. Until about 1880 this sugar was the cheapest and most accessible form of sweetening in many parts of the United States; but with the cultivation of sugar beets and the reduced cost of importing and shipping cane sugar, maple sugar soon ceased to be a necessity in the United States and became, as it is now regarded, a luxury.

Perfectly "purified" maple sugar would be indistinguishable from cane or beet sugar, for pure sugar is without smell or flavor, being simply sweet. The darker sugar has more impurities and the lighter sugar less. Since maple sugar varies in color and taste according to the impurities, a certain minimum of accessory substitutes is desirable in order to impart the maple sugar flavor.

Although there are about thirteen different species of maple trees growing in the United States, about 90 per cent of the syrup used today is made from the sugar maple (*Acer saccharum*) whose home is northeastern North America. Other maple trees have a sweet sap also but few yield enough to be tapped profitably.

These trees grow very slowly, frequently reaching an age of 300 or 400 years. Tapping, properly done, does not injure them. They are easily planted in groves and grow well in most soils but those planted on hilly land or near a cold spring yield better sap than those growing in low lands. The more uneven and rocky the soil the better the products. Thus many factors—

location, altitude, sparseness of growth, age and vitality—influence the quality and quantity of the sap.

As the days grow warmer and snow melts in late winter the sap in trees begins to flow upward from the roots to the branches. Cold nights, frozen ground and warm days are best for tapping. The sap that flows from the trees earliest in the season is the sweetest and purest sap, giving the lightest and best sugar. Later, as the buds begin to swell and open, the sap becomes bitter in taste and smell.

The maple sugar season is short, January to February in some sections and March and April in others. The average length of the maple sugar season for any one locality is thirty-four days. There is still snow on the ground when the season begins in New England and sleds are used to carry the sap to the sugar houses.

Trees are tapped by boring holes one and one-half inches deep into the trunk as the sugar-bearing sap seems to come from the outer layers of wood. Iron spouts one-half to three-quarters of an inch in diameter are inserted and a tin bucket is hung at the open end. In sunshiny weather the sap drips into the bucket at the rate of about seventy drops a minute although on cloudy days the sap runs slowly. Fair-sized trees yield about thirty gallons of sap in a season. Since there are about three ounces of sugar to a gallon of sap, four or five pounds of sugar is an average yield. Sap is boiled to 215° for syrup or 250° for sugar and 90 per cent of it is made into syrup.

During the past forty years the amount of maple sugar produced annually in the United States has been valued at about $12,500,000 and has varied little from an average of 46,000,000 pounds of sugar each year. This is about one-third of the amount of maple sugar produced in 1880, the last peak year. The felling of maple groves for cultivated land and the decreasing prices of cane and beet sugar are largely responsible for the lowered production of maple sugar; and yet only about one-fifth of the American maple sugar trees are tapped and the remainder form a source of sugar untouched in this country.

MARIE B. PABST
Raymond Foundation

NOTE: In Hall 25 there are exhibits of the various kinds of sugar (note especially the colored transparencies in the windows) and in Hall 4 are the utensils used by the Woodland Indians in preparing maple sugar.

This page is for your own notes and illustrations

FIELD MUSEUM STORIES

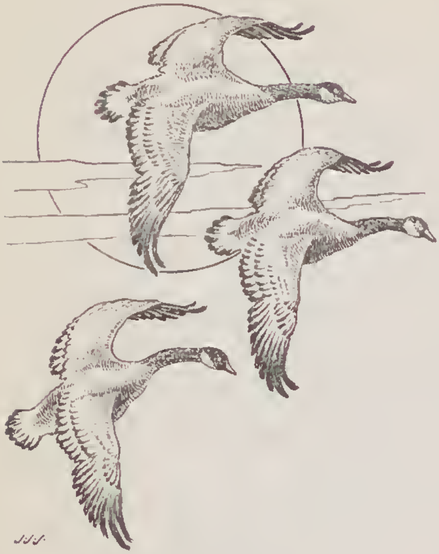
Journeys of the Birds

Possible Reasons for Bird Migration

Series XXXVIII, No. 5
April 4, 1942

Looseleaf No. 59

SOME POSSIBLE REASONS FOR BIRD MIGRATION



Wild Geese

Sounding in the distance like the far-off yapping of very small dogs, twice a year come the calls of the wild geese flying overhead. Their V-shaped formations are a reminder in autumn that long lines of birds are moving south, in spring that they are on their way north once more. Some birds, like the cardinals, English sparrows, or crows, stay out the year wherever winter finds them, but many others, seen in early spring and summer, start their trip south long before cold weather comes. Some of these may travel only a few hundred miles; some may go thousands. The meadowlark, whose clear notes are heard throughout the fields and pastures of Illinois from April to September, spends the rest of the year in Texas, Louisiana, and the neighboring states. The bobolink, from the same fields, heads in September for the tip of Florida. From there it flies the 150 miles to Cuba, then on to Jamaica, and next makes the long 500-mile stretch across the Caribbean Sea to the South American coast. It continues to move steadily southward and finally settles for the winter months in the central part of South America. Although the dates on which birds start their migration and the places to which many of them go are known, yet the reasons why they go are not known.

There are many explanations; most of them suggest that once upon a time birds spent all their time in whatever place they happened to be, but as the years went on something in their home became so unfavorable to them that they moved away at certain periods of the year. Perhaps some of those living in the warm southern parts of the world were crowded north at the breeding season when the scramble started for nest-space, worms, and seeds for the young. Perhaps others farther north, either natives or visitors, were pushed down to camping grounds in the south each year by the sleets and snows of winter. It eventually came about then that the birds which yearly went south, began to do so without waiting for the first snow. Many were young ones, entirely unacquainted with winter, that would go alone or along with their elders while still there was the food and warmth of late summer around the nest. Apparently, in certain kinds of birds, the urge to fly south and later return north, had become an instinct—something that the bird could do without any experience or training, something that benefited it without planning on its part.

If the bird knows nothing of winter and yet has the instinct to leave the spot where winter presently may come, something must make this instinct go to work at the proper season, but what this something is no one knows—it may well be different for various kinds of birds. Many influences differ from year to year—for example, the temperature and the speed of the wind are perhaps high one day and then low on the same day of the month in another year, so that their influence on the very regular take-off time of some migrants can not be great. It is thought by many people that it may be the amount of light each day, changing like clockwork with the time of the year, that determines when some birds start south. Most birds settle down to sleep when the sun sinks, so that as summer turns to autumn the hour to roost each night comes earlier, and chances for hopping and flying are fewer. This lack of exercise seems to cause certain parts of the bird's body—those that produce the eggs and lead the bird to build nests—to become smaller, and as they do, the bird loses all inclination to busy itself with family affairs. Apparently it is only then that the instinct to leave the nesting grounds and fly south becomes strong. In the spring the migratory instinct seems to start operating in a different way, for after the bird has spent long days in feeding and flying and the parts important for egg-making are again grown large, it makes the return trip north. Perhaps more fortunate than other birds, those that migrate can usually have, all the year round, food, water, and warmth in abundance, advantages that evidently outweigh the dangers of the long round trip made each year.

ELIZABETH BEST
Raymond Foundation

NOTE: Many of the birds that migrate can be found in Halls 20 and 21.

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FIELD MUSEUM STORIES

Market Day in Mexico

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April 11, 1942

Looseleaf No. 60

Mexican Market Scene

On market day in Mexico, even before sunrise people are up and on their way to the town where the market is to be held. Some of them have their wares in carts pulled by plodding oxen. Some drive sleepy-looking donkeys laden with heavy packs. But most people carry the loads themselves. The women carry big baskets balanced on their heads. The men are bent over from the heavy loads on their backs, held in place by burden-straps which pass across their foreheads. Some hold a pair of chickens by their legs, head downward, or a protesting little pig under one arm. Many of the women carry babies on their backs, or lead small children by the hand.

As they arrive in town the people wend their way to the market place, a large open square in the middle of town. Each article has its special place in the market. The woodsellers stack their loads of neatly cut kindling wood in one part. The women who have pottery to sell spread their pots on the ground in another part. In one place there are piles of baskets and wide-brimmed straw hats, coils of rope, or straw mats which are used as beds. Near the church are sold long wax candles and little bundles of fragrant incense to be burned in front of the altars.

Many kinds of food are being sold under awnings which protect it from the hot sun. There are big pieces of meat and piles of eggs. The fruits and vegetables have been brought from many parts of Mexico by traveling merchants. Golden pineapples and reddish brown chocolate beans come from the tropical coast lands, potatoes, coffee beans, and wheat from the cooler highlands. Most common of all are the pink and red beans, corn to be made into flat pancakes, called "tortillas," and red and green chili peppers which are often cooked with food to give it a spicy flavor. There are heaps of yellow bananas, pyramids of shiny oranges and limes and rosy tomatoes, and many other tropical fruits such as mangoes, papayas, and avocados.

The flowersellers' corner is one of the gayest. Depending upon the season one can find sheaves of waxy white calla lilies, sweet-smelling violets and gardenias, and orchids of many kinds, from huge purple ones to tiny speckled brown and yellow ones which look like butterflies.

Children cluster around the candyseller, who keeps his brightly colored sweets in a glass case to keep away the buzzing flies. They also stop to look at the toyseller's booth. He sells little painted clay animals and whistles, and funny masks of bulls and dogs and even of the devil. The children also like toys which come from the United States: dolls, model airplanes, and baseballs and bats. Baseball is one of their favorite games.

The sounds of the market are very interesting. Against the low hum of voices a chicken squawks, a turkey lets forth his throaty gobble, or a pig squeals at the top of his lungs. Sometimes the church bells announce the hour or a mass. The ice-cream vender pushes his cart along, calling "helados," which is the Spanish word for ice-cream.

Women wander through the market place with their baskets on their arms, stopping here and there to greet a friend, to bargain for a handful of beans, or to feel a chicken to see if it is fat. Bargaining is half the fun of buying. There are seldom any set prices and it may take an hour or more to come to an agreement on a price. While they are bargaining the women trade news and gossip, and, since most of the people do not know how to read, this is the only way they can learn the latest news.

There are shops around the edges of the square and on the side streets where people can buy manufactured goods such as shoes, needles and knives, and tin pots and pans. These are made in the big cities or imported from the United States, but most of the things which are sold in the market are made or grown by the people on their small farms.

By the end of the day the sellers begin to pack up their unsold goods and start back to their houses which may be many miles away. With the money they have gotten from selling their wares they may have bought a piece of cloth for a dress, a new knife, or a piece of soap. They may not have sold much, but they have had a good time seeing their friends and learning the news.

ELIZABETH McM. HAMBLETON
Raymond Foundation

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FIELD MUSEUM STORIES

The Chimpanzee—a Jungle Native

Series XXXVIII, No. 7
April 18, 1942
Looseleaf No. 61

THE CHIMPANZEE—A JUNGLE NATIVE

Chimpanzee expressing interest

In the Middle and West African forests that lie along the equator is the home of the chimpanzee. There, in the greenhouse-like warmth and moisture, long, rope-thick vines climb the many trees and lose themselves among the branches. Tangled masses of bushes, large-leaved plants, and flowers cover much of the ground below, and everything is splotched alternately with sunlight and raindrops.

The chimpanzee, with its near relatives, the gibbon, gorilla, and orang-outan, is one of the man-like apes, so-called because it has the general body build of human beings, has no tail, and can stand or walk upright on its legs. Though like man in many ways, the chimpanzee differs from him in as many others. The height of the animal is not great; in the male it is usually about five feet, in the female almost a foot less. In weight and muscle, however, it often outdoes many men, for a large male will sometimes reach 175 pounds and arrive at a strength several times greater than that of any human being. The arms of the chimpanzee have the appearance of being long, and most of the body is so covered with coarse, dark hair that at first glance it might almost be mistaken for that of a short-legged boy dressed in a bear-skin coat. In some of the ways that the hands and feet operate, they are almost the reverse of those of man. The thumb is small and feeble, but the big toe is large and powerful and can be bent across and under the other toes so that it helps the foot to grasp branches or grasses as easily as any human hand. One of the most interesting parts of the animal is the face. The eyes, rather close together, are set in wrinkles and shaded by heavy eyebrow ridges. Between and below them lies the small, unimportant-looking nose, and, far below, the mouth; the jaws jut forward into a rounded dog-like muzzle, and the lips, in order to cover them, are long, wide, and extremely movable. They can be drawn back in a snarl of rage, shaped into a tube, in pleasure, and twisted to suit a variety of other expressions and moods.

Part of the time the chimpanzee spends in the trees, part on the forest floor. In walking it carries its weight about on all fours—the toes flat or curled under, the fingers bent, so that only their backs and the knuckles touch the ground. In climbing or traveling through the trees, the arms are the most important parts, and after carefully testing each new branch, the hands give the heavy body a short swing from the old one. Some chimpanzees not only spend waking hours in the trees, but also build nests in them for their sleeping time as well. Each animal usually makes its bed some ten feet above the ground by breaking, bending, and pulling branches under its body until there is a small, quite stout platform. Upon that it can lie and be fairly safe until morning from lions, leopards, and snakes.

From beginning to end, the life of a chimpanzee is usually spent in the company of its family or with others of its own age. An older male ordinarily is in charge of the family and with him, on the daily expeditions, go several females and young ones. Kept loosely together by shouts, grunts, and gestures, each searches out its own food—eggs, or young birds, insects and small mammals, but chiefly leaves and fruits of many kinds. The newly born chimpanzee, small and scrawny in appearance, weighs only about three pounds, and through its first year and well into the second it is combed, cleaned, and closely watched over by its mother. By the time it has reached the seventh or perhaps the tenth year, it has left childhood behind and the rest of its days, whose number no one knows, are spent less in play and more in the business of being an adult chimpanzee.

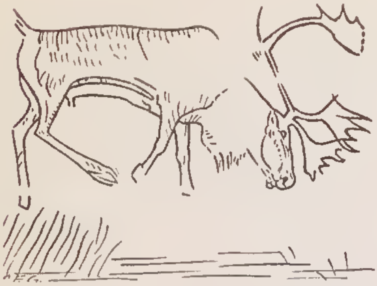
ELIZABETH BEST
Raymond Foundation

NOTE: Several chimpanzees can be seen in Hall 15.

FIELD MUSEUM STORIES

The First Artists

Series XXXVIII, No. 8
April 25, 1942
Looseleaf No. 62



It is hard for us to think of a time when there were no beautiful pictures, no graceful figures cut from stone or marble and no jars fashioned from the clays of the earth. These are a very important part of our art today, yet the Chellean and Neanderthal peoples had none of them as far as any one has been able to discover. The entire time of those early men seems to have been spent in procuring food and shelter and protecting the family from enemies of all kinds.

Not until the time of the Aurignacians of about 35,000 years ago do we become acquainted with art of any kind. These Cro-Magnons, as they were called, seem to have been a superior kind of men with fingers better trained to make and use bone, flint, and obsidian tools. They dressed and shaped animal skins for clothing, made bone handles for flint blades, and collected teeth, shells, mammoth ivory and stones which they pierced with long, pointed bone awls for necklaces.

They drove fierce animals from the choicest caves and used the dangerous winding passageways and still, dark caverns as rooms in which to record their art. Evidently they did not wish all people to see what they did for sometimes the drawings are far, far from the entrances of the caves. Often, they can be seen only by crawling on hands and knees through tiny openings, or by lying on the back and looking up at the ceiling. A very famous ceiling painting of some bisons was discovered in just such a place by a child who had accompanied her father into a cave.

Whether the art of the Aurignacians was part of their religion and could be seen only by those connected with that religion, whether it had something to do with magic and the securing of animals in the hunt, or was just for the beauty of outline and color, one cannot say.

The Cro-Magnons really had two kinds of art. First came the carvings and engravings; then the paintings. At first the engravings were just wavy lines on clay surfaces, but later the artists learned how to cut deep lines in the hard stone walls with a flint tool called a "burin." The first paintings seem to have been simple outlines of hands pressed against a wall and outlined with color. Such hands frequently show whole or parts of fingers missing, but never the thumbs. Occasionally, if one looks closely at the early animal pictures, it is possible to trace the finger marks that outlined the shape, or to see the deep cuts made by the engraving tool. Among the animals shown in the pictures made by these earliest of artists are the mammoth, bison, horse, wild cattle, stag and woolly rhinoceros—all animals of the dry, cold tundra climate of the period in which the early Aurignacians lived. Often the drawings are just profiles (side views) with heads too small for the large stocky bodies, with just two legs and the horns shown as seen from the front. But as time passed and the men became more accustomed to their tools and to observing the animals more accurately, we find the pictures become as natural as if made by people of today. Fish, birds, and even plants are shown singly or in groups. And the reindeer becomes the most important animal, and is worked out in marvelous detail.

People seeing the cave pictures for the first time are often amazed at the colors used. In a few locations the paintings have been so well preserved that the colors are still bright; in other caves, they are dim and hard to see.

The colors used were black, red and yellow. Charcoal or the mineral called manganese supplied the black; the red and yellow were made from iron rust or ochre. Often, the artist used the color in pieces as we do sticks of colored chalk; again, the colors were ground to a powder and mixed with water, marrow or grease. They were then spread on with fingers or some kind of brush. Several of the bone paint tubes with colors still clinging to the inside have been found as well as some of the stone saucers in which the colors were crushed with pestles.

Not only did the Aurignacians carve on the walls, but they were sculptors. From bone, ivory and stone they shaped images of human beings. Looking at their statuettes of women, we are interested to see how much they are like the Bushman and Hottentot women of Africa today. Most of their statues are of women.

Thus did those early cave people lay the beginning of carving, engraving and painting, and how they did it will always remain one of the wonders of their story.

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NOTE: In Hall C on the ground floor may be seen a diorama showing an Aurignacian man making a picture of his hand.

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